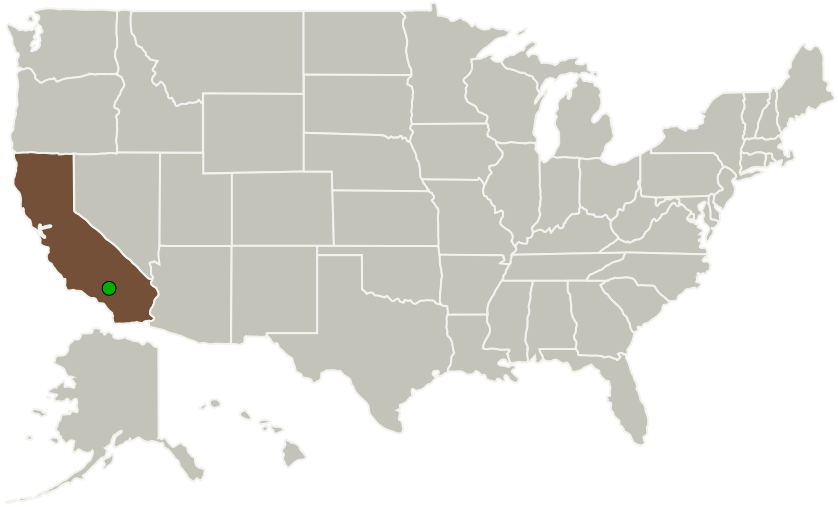
Robust, Self-Contained and Bio-Inspired Shear Sensor Array, Phase I

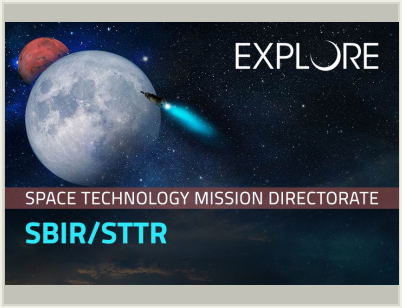
Completed Technology Project (2011 - 2011)

Project Introduction

The proposed innovation is a robust, bio-inspired, and self-contained sensor array for the measurement of shear stress. The proposed system uses commercially available off-the-shelf (COTS) components to create a distributed sensor array for the measurement of shear stress in either a flight or ground test environment. The reusable sensor array requires no external wiring or power source. The bio-inspired system is based on mimicking the sensitivity and response of a single hair fiber/receptor neuron to sense flow velocity very near a surface. An array of the hair cell inspired shear sensors are embedded in a flexible, self-adhesive backed sheet of polymide substrate, which also contains a self-contained, battery operated acquisition system. The self-contained blanket array can be quickly and easily applied to aircraft or vehicle surfaces in question. No wiring, external power, or control is required. After testing, the system can be quickly removed and reused. In addition to measurement of shear stress, the sensor array should be able to determine laminar/turbulent boundary-layer transition locations, laminar/turbulent separation and reattachment lines, and shock locations. The proposed bio-inspired shear sensor array promises to provide a robust, realizable, accurate, efficient, and cost effective measurement system.

Primary U.S. Work Locations and Key Partners





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Completed Technology Project (2011 - 2011)

Organizations Performing Work	Role	Type	Location
Rolling Hills Research Corporation	Lead Organization	Industry	El Segundo, California
Armstrong Flight Research Center(AFRC)	Supporting Organization	NASA Center	Edwards, California

Primary U.S. Work Locations
California

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138473)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Rolling Hills Research Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Michael Kerho

Co-Investigator:

Michael Kerho

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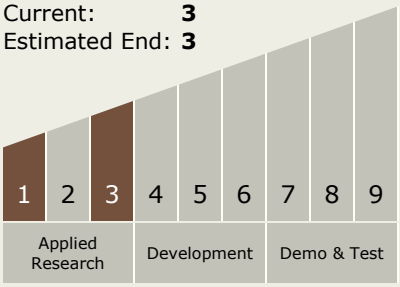
Completed Technology Project (2011 - 2011)

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.1 Aerodynamics

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System